

NIOSH Fire Fighter Fatality Investigation and Prevention Program Annual Report: 2003

Foreword

In fiscal year 1998, Congress recognized the need for further efforts to address the continuing national problem of fire fighter line-of-duty deaths, and funded the Centers for Disease Control and Prevention's (CDC) National Institute for Occupational Safety and Health (NIOSH) to undertake this effort, thus creating the Fire Fighter Fatality Investigation and Prevention Program.

The overall goal of this program is to better define the magnitude and characteristics of line-of-duty deaths and severe injuries among fire fighters, to develop recommendations for the prevention of these injuries and deaths, and to disseminate prevention strategies.

Introduction

This report focuses on ***traumatic injury fatality*** investigations performed by the team based in NIOSH's Division of Safety Research in Morgantown, West Virginia. Traumatic injury investigations include fatalities due to asphyxia, motor vehicle-related (MVR) incidents, electrocution, burns, drowning, and other blunt trauma. A separate NIOSH team, based in Cincinnati, Ohio, investigates cardiovascular-related fatalities.

This report includes only traumatic injury fatalities investigated by NIOSH. Investigations performed during the current year may include incidents that occurred in prior years. Comprehensive figures on fire fighter fatalities are available from the United States Fire Administration (www.usfa.fema.gov) and the National Fire Protection Association (www.nfpa.org).



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Victims

The 23 victims included nine career fire fighters and 14 volunteer fire fighters, with an average age of 39 years. The ages of fire fighters ranged from 16-63 years old, with two female and 21 male victims. The 16 year old was a junior volunteer fire fighter. The average career victim was 35 years old, and had served 12 years as a fire fighter. The average volunteer victim was 40 years old, and had served 11 years.

Causes of fire fighter deaths investigated in 2003 include asphyxiation, burns, MVR trauma, and non-MVR trauma. MVR trauma includes vehicle crashes as well as fire fighters on foot or bicycle who are struck by motor vehicles. Examples of non-MVR traumatic injuries include those suffered in a structural collapse. The majority of the career fire fighter victims' deaths were attributed to burns and MVR traumatic injuries. The cause of death attributed to most of the volunteer fire fighter victims was MVR trauma.

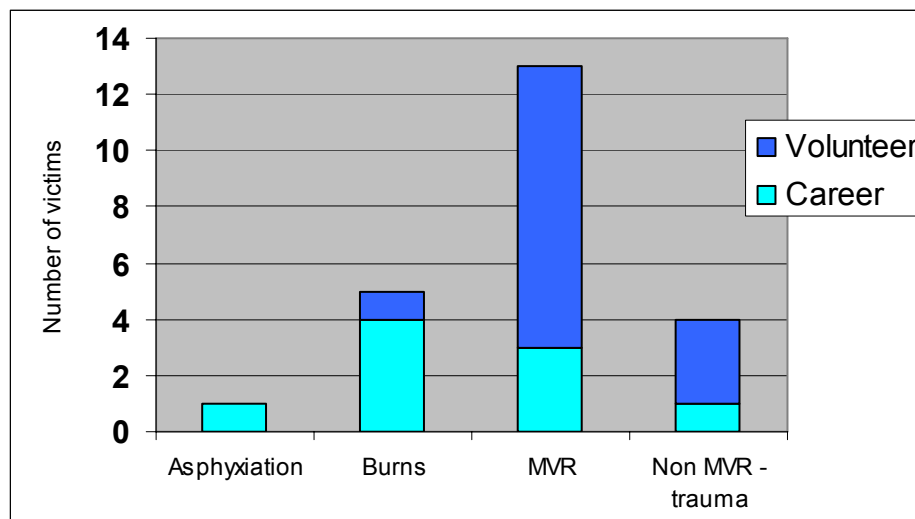


Figure 2. Causes of death in NIOSH fatal injury investigations by type of department, 2003

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Departments

Departments involved in investigations included five career, eight volunteer, and eight combination departments. Combination departments include career and volunteer fire fighters. Figure 3 illustrates the average number of personnel per investigated department, with averages ranging from 30 in volunteer departments to 875 in career departments. The average number of square miles protected by departments range from 224 miles in combination departments to 612 miles in volunteer departments (Figure 4). The volunteer departments served an average population of 4,060, while the average for career departments was 451,000 (Figure 5).

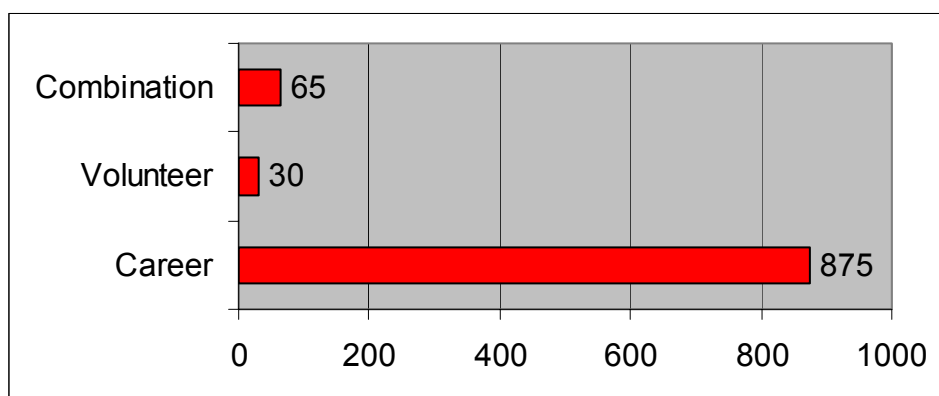


Figure 3. Average number of personnel in fire departments in which NIOSH conducted a fatal injury investigation, 2003.

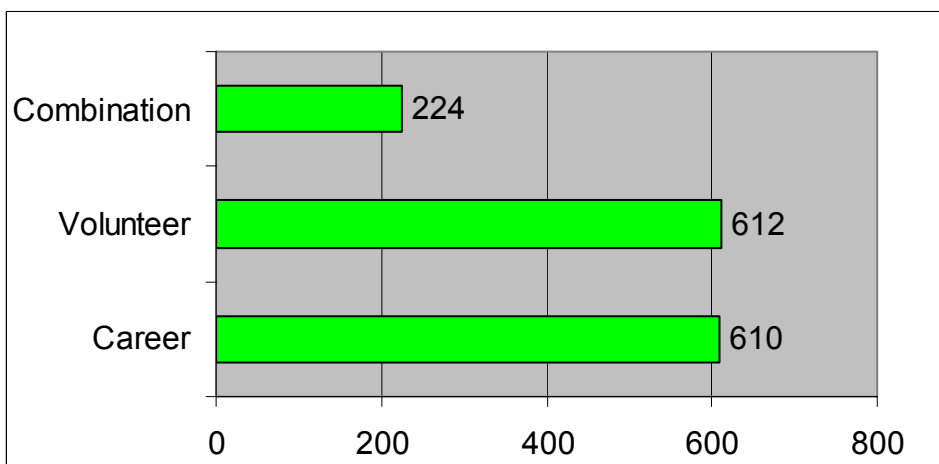


Figure 4. Average square miles covered by fire departments in which NIOSH conducted a fatal injury investigation, 2003.

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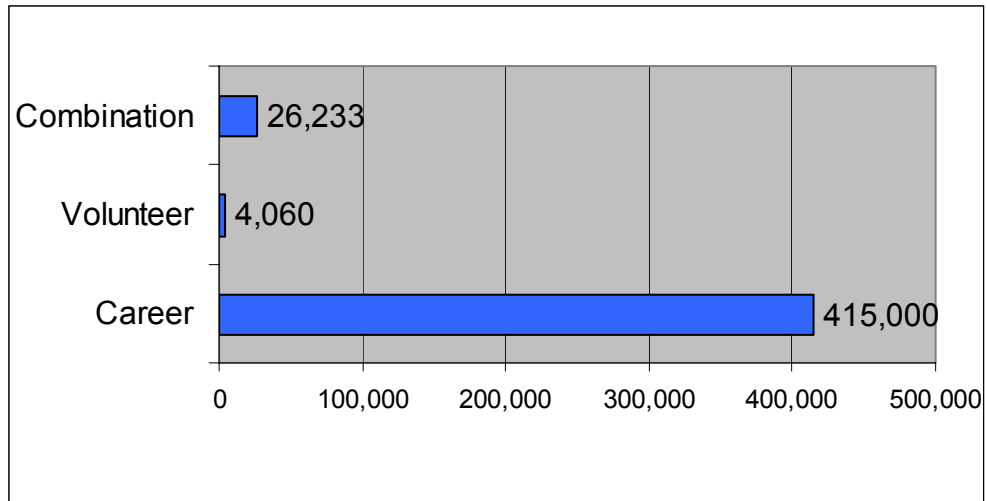


Figure 5. Average population served by fire departments in which NIOSH conducted a fatal injury investigation, 2003.

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Incidents

The team investigated five structure fire-related fatalities, including two in a silo explosion, 13 MVR fatalities, and five other types, including a death at a wildland fire, and one at an airbag deployment demonstration.

More than 45 percent of the fatal incidents occurred on the fireground or at the scene of a motor vehicle crash, while 32 percent occurred during travel. Another nine percent occurred during training. The investigations of structure fire victims involved three career fire fighters and one volunteer. Thirteen MVR investigations were performed, nine of which involved volunteers.

Table 1. Details on fatal injuries investigated by the NIOSH Fire Fatality Investigation and Prevention Program, 2003.

Fatal Injury	Location of Fatal Incident	Number of Victims	Percent
ASPHYXIATION	EMERGENCY SCENE – FIREGROUND	1	4.3
BURNS	EMERGENCY SCENE – FIREGROUND	3	13.0
BURNS	WILDLAND FIRE	1	4.3
BURNS	EMERGENCY SCENE – MVR	1	4.3
MVR	EMERGENCY SCENE – MVR	2	8.7
MVR	TRAVEL TO INCIDENT	8	34.8
MVR	ROAD CONSTRUCTION SITE	1	4.3
MVR	TRAINING	1	4.3
MVR	NON-EMERGENCY AMBULANCE TRANSPORT	1	4.3
NON-MVR TRAUMA	AIR BAG DEMONSTRATION	1	4.3
NON-MVR TRAUMA	TRAINING	1	4.3
NON-MVR TRAUMA	EMERGENCY SCENE - FIREGROUND	1	4.3
NON-MVR TRAUMA	WILDLAND FIRE	1	4.3

Structure Fires

Five structure fire incidents were investigated. There were seven total victims, as two of the structure fire investigations involved two victims each. Fatalities resulted from burns, asphyxiation, and blunt trauma.

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Investigators were able to determine the amount of time spent at the scene prior to the fatal injury for all seven structure fire victims. The average amount of time spent on-scene was approximately 54 minutes.



Fig 6. Minutes victims were on-scene at structure fire incidents investigated by NIOSH, 2003.

In the five structure fire incidents, the number of personnel responding ranged from three to 75.

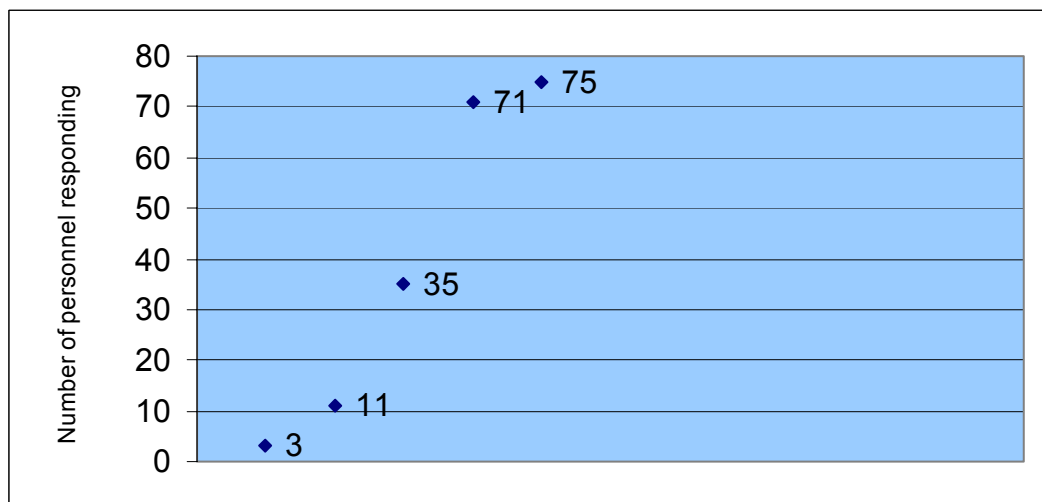


Fig 7 . Number of fire fighters responding to structure fire incidents investigated by NIOSH, 2003

Four structure fire incidents had an incident management system in place and one did not.

Motor Vehicle-Related Incidents

The MVR investigations involved eight crashes, three struck-by incidents, and two incidents of fire fighters falling from moving vehicles. In the crash incidents, one occurred during traveling to training, while six occurred during travel to an emergency scene (including one fire fighter/EMT

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responding to a vehicle crash scene in an ambulance). One fire fighter/EMT was killed during non-emergency transport in an ambulance. Only two of the eight crash victims were wearing safety restraints.

One struck-by occurred while the fire fighter was directing traffic; another occurred at a road construction site; and one fire fighter was struck by a tractor-trailer while crossing a highway responding to a motor vehicle incident.

One fire fighter fell from an open-cab apparatus en route to an airport emergency, while a second fell from the tailgate of a pick-up truck following a training exercise.

Table 2. Apparatus crashes investigated by the NIOSH Fire Fighter Fatality Investigation and Prevention Program, 2003.

	Vehicle Type	Type of Department	Event	Seating Position	Wearing Seatbelt?
Victim 1	Ambulance	Career	Collision Left roadway/Struck object	Front Passenger	Yes
Victim 2	Engine	Volunteer	Overturn/rollover	Front Passenger	Yes
Victim 3	Tanker	Volunteer	Left roadway/Struck object	Driver	No
Victim 4	POV	Volunteer	Overturn/rollover	Driver	No
Victim 5	Tanker	Volunteer	Overturn/rollover	Front Passenger	No
Victim 6	Tanker	Volunteer	Overturn/rollover	Driver	No
Victim 7	POV	Volunteer	Overturn/rollover	Driver	No
Victim 8	Ambulance	Volunteer	Overturn/rollover	Driver	No

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Data appearing in this report were derived from the following traumatic fatality investigations:

Number	Title	Report Completed
F2003-03	Volunteer Fire Fighter Dies Following Nitrous Oxide Cylinder Explosion While Fighting a Commercial Structure Fire – Texas	✓
F2003-04	Career Firefighter Dies from Injuries Received during a Chimney and Structural Collapse after a House Fire – Pennsylvania	✓
F2003-05	Career Fire Fighter/Emergency Medical Technician Dies In Ambulance Crash – Texas	✓
F2003-07	Career Fire Fighter/Emergency Medical Technician Dies from Injuries Sustained in Fall from Apparatus – California	✓
F2003-12	Career Fire Fighter Dies at Residential Structure Fire – Ohio	
F2003-13	Volunteer Fire Fighter Killed While Walking Across an Interstate Highway Responding to a Motor Vehicle Incident – Texas	✓
F2003-14	Volunteer Captain Killed in Fire Apparatus Crash While Responding to a Training Exercise – Oregon	✓
F2003-15	Volunteer Fire Fighter Dies in Tanker Rollover – Ohio	✓
F2003-16	Volunteer Fire Police Captain Dies From Injury-Related Complications After Being Struck By Motor Vehicle While Directing Traffic - New Jersey	✓
F2003-17	Volunteer Training/Safety Officer Dies from Injuries Received in Fall from Pick-Up Truck Following Training Exercise - Tennessee	✓
F2003-18	Partial Roof Collapse in Commercial Structure Fire Claims the Lives of Two Career Fire Fighters – Tennessee	✓
F2003-19	Volunteer Fire Fighter Killed After his Privately Owned Vehicle Hydroplaned and Struck a Billboard Signpost - Kentucky	✓

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F2003-20	Junior Volunteer Fire Fighter is Killed While Responding to a Brush Fire with an Intoxicated Driver - Wyoming	✓
F2003-23	Volunteer Assistant Chief Dies in Tanker Rollover - New Mexico	✓
F2003-25	Career Federal Fire Fighter Dies from Injuries Sustained at Prescribed Burn – Arizona	
F2003-30	One Volunteer Lieutenant Dies and a Volunteer Fire Fighter is Seriously Injured in a Motor Vehicle Rollover Incident While En-route to a Trailer Fire – North Carolina	✓
F2003-32	Two Fire Fighters Die and Eight Fire Fighters are Injured from a Silo Explosion at a Lumber Company – Ohio	
F2003-33	Career Fire Fighter/Emergency Medical Technician Dies in Ambulance Crash - Nebraska	
F2003-34	Volunteer Fire Fighter/Fire Service Products Salesman Dies After Being Struck by Dislodged Rescue Airbag - South Dakota	✓
F2003-36	Career Fire Fighter Dies in Wildland Fire Burnover - California	
F2003-37	Volunteer Assistant Chief is Struck and Killed at Road Construction Site - Minnesota	✓